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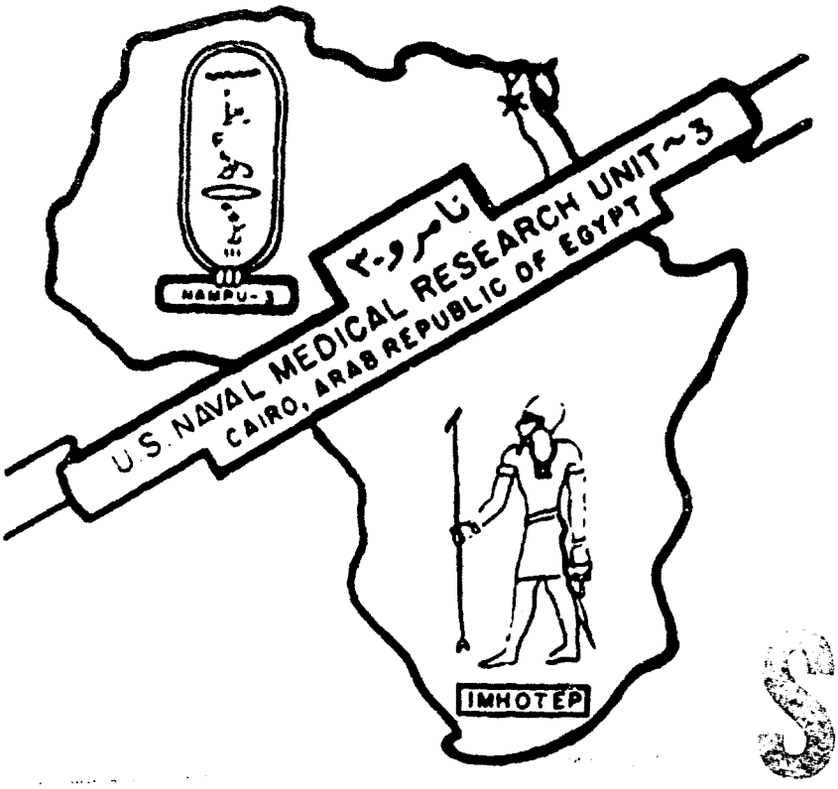

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ACARINA OF SAUDI ARABIA ORNITHODOROS (ALVEONASUS) LAHORENSIS IN SAUDI ARABIA BIOLOGICAL, VETERINARY, AND MEDICAL IMPLICATIONS

BY

Hoogstraal, H., Wassef, H.Y., Diab, F.M., Al-Asgah, N.A. and Al-Khalifa, M.S.

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Acarina of Saudi Arabia
Ornithodoros (Alveonasus) lahorensis (Fam. Argasidae) in Saudi Arabia Biological, Veterinary, and Medical Implications

H. Hoogstraal, H. Y. Wassef, F. M. Diab, N. A. Al-Asgah, M. S. Al-Khalifa

Abstract: A third-instar nymph of *Ornithodoros (Alveonasus) lahorensis* taken from an indigenous goat at Al Sharayi, Makkah, provides the first evidence for the presence in Saudi Arabia of this widely distributed Palearctic parasite. *O. (A.) lahorensis* has been incriminated in the epidemiology of a variety of agents causing diseases in man and livestock in Eurasia.

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قـــراد المملكـــة العربيـــة السعوديـة

Ornithodoros (Alveonasus) lahorensis

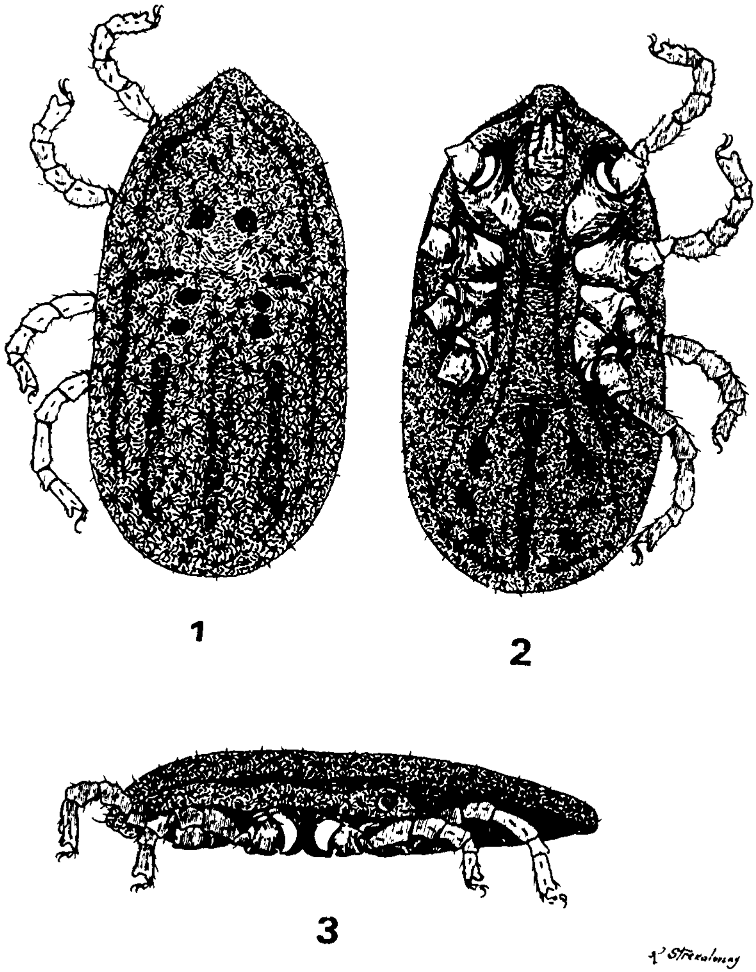
(عائلة Argasidae) بالمملكة العربيـــة السعوديـــة

الدلالات البيولوجيـــة ، البيطريـــة ، والطبيـــــة

هارى هوجسترال ، هيلدا يوسف واصف ، فتحى مسلم دياب

ناصر الأصقه و محمد صالح الخليفة

خلاصـة: أثبت الحصول علـى الطـور العـذرى الثـالث لنـوع القـراد Ornithodoros (A.) lahorensis لأول مـرة والـذى جمـع مـن الماعـز المحلـى ببلدة الشرايـع بمنطقـة مكة المكرمة، على وجـود هـذا النـوع بالمملكة العربيـة السعوديـة وهـو طفيـل واسـع الانتشـار بالمنطقـة البليركتيـة ، و مسؤول عـن انتشـار عـدد مـن مسببـات الأمـراض الوبائيـة لكـل مـن الانسان وحيوانـات المزرعـة فـى آسيـا الأوروبيـة (أوراسيـا).



Figs 1–3. *Ornithodoros (Alveonasus) lahorensis* ♂ (sheep and goat stable, Van, Van, Turkey, 17 July 1954, H. Hoogstraal and M.N. Kaiser, HH15,647), dorsal, ventral, and lateral views (NAMRU-3 illustration by Roman Strekalovsky)

INTRODUCTION

The discovery of *Ornithodoros (Alveonasus) laborensis* Neumann (figs 1–3) in Saudi Arabia has significant biological, veterinary, and medical implications.

An engorged third-instar nymph of this species (HH16, 794) was taken from a domestic goat at Al Sharayi (altitude 1000 m), Makkah, on 16 February 1984, by Fathi M. Diab, Nasr A. Al-Asgah, and Mohamed S. Al-Khalifa. (The nymph died six days afterward and is preserved in the Hoogstraal Tick Collection.) The infested goat was part of a flock which has grazed up to 1340 meters altitude in the hills surrounding Al Sharayi for ten years and is kept in pens in the wadi at night (fig. 4). The chief vegetation in the wadi is *Euphorbia* spp., *Calotropis procera*, *Citrullus colocynthis*, and *Acacia* spp. The collecting site is in the Al Sarawat mountain range which extends, parallel to the Red Sea, from Al Hijaz in the north to Asir in the south and reaches its highest peak (3960 m) at Sana'a, the Yemen. At Al Sharayi in winter, precipitation is about 76 mm, mean relative humidity range 35% to 83%, and mean temperature range 6.8°C to 26.2°C. In summer, these figures are 0 mm, 14% to 35%, and 22°C to 39.2°C, respectively (data from Hydrology Division, Ministry of Agriculture and Water, Riyadh).

The goats were also infested by ixodid ticks, *Hyalomma (Hyalommina) arabica* Pegram, Hoogstraal & Wassef, and *Rhipicephalus (R.) turanicus* Pomerantsev & Matikashvili, and by keds flies (Diptera, Hippoboscidae; probably *Melophagus ovinus* L.; see Buttiker, 1980). Except for rodents, the only other mammal known near Al Sharayi is the Arabian (Sacred) Baboon, *Papio hamadryas arabicus* Thomas, which comes during the night and early morning to eat food provided for the goats.

The collecting site was revisited on 15–16 March and 20 April 1984, but no additional specimens of *O. (A.) laborensis* were found on the goats, in the pens, or under debris and trees. The search for this parasite in this locality and elsewhere in Saudi Arabia will be intensified as time permits.

IDENTITY

Adult *Ornithodoros (Alveonasus) laborensis* (figs 1–3) are easily differentiated from those of the other *Ornithodoros* species recorded from Saudi Arabia [*O. (O.) savignyi* and *O. (Pavlovskyella) erraticus* (Hoogstraal et al., 1981) and *O. (Alectorobius) muesebecki* (Hoogstraal and Bafort, 1982)] by the distinctive stellate integumental pattern, formed by concentric ridges and small pits, which replace the regular integumental mammillae of the other three species. The tarsi are flat (unhumped) dorsally and taper apically in *O. (P.) erraticus* and *O. (A.) muesebecki*. All tarsi and metatarsi of *O. (O.) savignyi* are conspicuously humped dorsally. In *O. (A.) laborensis*, each tarsus bears a distinctive dorsoapical projection but dorsal humps are less conspicuous and confined to tarsus and metatarsus I. Later-instar nymphs of each species are much the same as adults in these characters.

DISTRIBUTION AND HOSTS

O. (A.) laborensis, originally a parasite of the Asiatic mouflon, *Ovis orientalis arkal*, and other wandering artiodactyls resting beside cliffs, is now a notorious parasite of sheep, goats, camels, and cattle, especially in stone stables and dwellings, in steppe and mountain deserts from sea level to 2,900 meters altitude in Tibet, Kashmir, southern USSR and Southwest Asia (northern Pakistan to Syria), and Southeast Europe (Turkey, Bulgaria, Yugoslavia, Greece) (Filippova, 1966; Hoogstraal, 1985). Makkah Province

of Saudi Arabia is the most southwestern area recorded in the range of this parasite. A greatly engorged nymph was taken in Cairo in August, 1913, F. C. Willcocks *legit*, from a camel which had come «from Sinai or Syria» (Nuttall 2441; HH15,637). Our tick collection contains O. (A.) *laborensis* samples from Lebanon, Syria, Iraq, Turkey, Iran, Afghanistan, Pakistan, India (Kashmir), and USSR (Armenian SSR, Uzbeck SSR, Kazakh SSR).

Fig. 4. Goat herd infested by *Ornithodoros* (*Alveonasus*) *laborensis* at Al Sharayi, Makkah (photograph by F. M. Diab).

BIOLOGY

The 2-host life cycle of O. (A.) *laborensis* is exceptional among argasids (HOOGSTRAAL and AESCHLIMANN, 1982; HOOGSTRAAL, 1984). The larva remains on the host for three to six weeks and detaches as an engorged third-instar nymph which rests in a crevice and molts to an adult. After mounting another host, the adult feeds within an hour or two but can ingest as much as 228 mg of blood. However, third-instar nymphal feeding may be sufficient for an unfed female to deposit two viable egg batches. Typically, the larva attaches during fall or winter; the final nymph molts to an adult in spring. Mated fed or unfed females deposit batches of 300 to 500 eggs during warm months but unfed females require a bloodmeal to produce third and subsequent egg batches. The egg incubation period is two to six weeks. Unfed larvae can survive for a year, unfed adults for 18 years. Tremendous population densities often develop between bricks and stones, under plaster, and in cracks of roof supports of stables. One can rapidly determine whether a stable is heavily infested by searching for nymphal pelts entangled in

cobwebs on walls, in corners, and over windows. The contemporary success of *O. (A.) lahorensis* in this artificial environment, with a regular supply of hosts, results from its exceptional life-cycle adaptation, originally associated with small flocks or herds of wandering wild ungulates. The presence of even a single nymph parasitizing indigenous domestic animals in Saudi Arabia suggests that dense populations may remain to be discovered in suitable habitats of the Kingdom.

VETERINARY AND MEDICAL ASSOCIATIONS

O. (A.) lahorensis parasitism of domestic animals causes anemia, toxic reactions, and paralysis. This tick also transmits the agents of brucellosis and piroplasmosis. The agents of tularemia *(Francisella tularensis)* and Q fever *(Coxsella burnetti)* have been reported to be transmitted among domestic animals, and possibly to man, by *O. (A.) lahorensis* in Eurasia. Wherever *O. (A.) lahorensis* occurs, its potential role in the epidemiology of vectorborne disease agents of man and domestic animals should be investigated.

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Authors' addresses.*

Harry Hoogstraal, Ph.D., D.Sc., D.Sc. (hon.), D.h.c. and Hilda Y. Wassef, B.Sc., Medical Zoology Department, United States Naval Medical Research Unit Number Three (NAMRU-3), American Embassy, Cairo, Arab Republic of Egypt

Fathi M. Diab, M.Sc., Nasr A. Al-Asgah, Ph.D., and Mohamed S. Al-Khalifa, Ph.D., Zoology Department, College of Science, King Saud University, Riyadh, Kingdom of Saudi Arabia

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